Epi Notes

North Carolina Department of Health and Human Services ◆ Division of Public Health

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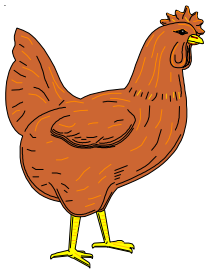
Avian Influenza: A Bird Flu Primer Announcement of PHTIN Broadcast

Prepared by Jeffrey Engel, MD, State Epidemiologist
Head, General Communicable Disease Control Branch



The flu is in the news once again because of a new, highly virulent avian influenza virus that is spreading like wildfire across East Asia. This multi-country outbreak has affected hundreds of millions of domestic poultry with devastating economic impact. Fortunately, this variety of flu infects primarily birds as humans become infected only after intensive contact with an infected bird. The virus, however, is extremely lethal with a case fatality ratio of 70% in the 29 people with known infections diagnosed in Thailand and Vietnam.

Influenza viruses are in the family *Orthomyxoviridae* and include 3 types: A, B, and C. B and C viruses are primary pathogens of mammals and humans, but type A infects a broad host range of vertebrates and is associated with more severe disease. Type A influenza strains are responsible for the infamous pandemics and are genetically unstable, capable of major recombination (shift) or mutation (drift) events. Shift-drift variants emerge over time usually within a single species, and rarely a new variant arises capable of infecting a new species.

Waterfowl and shore birds serve as the major reservoir for type A influenza. These birds carry the virus asymptomatically and shed high titers in their droppings. The virus is extremely contagious and is spread by fomites. It can survive for a prolonged time in the environment. Domestic poultry and mammals become infected by contacting droppings, wild birds, or even lake water. Complex interactions of humans and domestic animals have made new interactions possible including the use of chicken manure for fertilizer and the practice of keeping multiple species of domestic live animals in markets and small farms.

In Southeast Asia the practice of growing rice and allowing poultry (chicken, quail, and ducks) and swine in rice paddies between harvests probably explains why new flu strains continuously arise from this part of the world. A consequence of crowding these diverse animals together is the higher likelihood of a host being co-infected

(continued on page 2)

*(**Avian Influenza,** continued from page 1)*

with two varieties of flu virus, say one from a bird and another human. This allows for a recombination or shift event to occur and a new virus to be shed from the host.

Influenza A virus contains a single-stranded, negative sense RNA genome that is segmented into eight pieces each coding for a different viral protein. Two of these proteins, deemed hemagglutinin (H) and neuraminidase (N) are of major clinical and epidemiologic importance because they determine the strain nomenclature, virulence properties, and compose the major antigens. There are 15 known H and 9 known N molecules designated H1-15 and N1-9. Influenza A viruses are named by their host of origin, location of first isolation, strain number and year of isolation with the antigenic H and N given parenthetically [e.g. A/Swine/Iowa/15/1930 (H1N1)].

Avian influenza of domestic poultry is almost always of subtype H5 or H7. Avian strains are further characterized as either low pathogenic ("lo path") causing mild disease with few deaths or high pathogenic ("hi path"). In the laboratory, a hi path strain is one that kills more than 75% of birds after inoculation. The H protein of hi path strains also contains certain amino acid sequences that confer the pathogenic phenotype. In the field, hi path strains can wipe out flocks in a single day. Animals die from systemic illness, including pneumonia and hemorrhage. The type A hi path strain currently circulating in Southeast Asia is an H5N1. The lo path circulating in Delaware is an H7N2. Disease is not seasonal, occurring year-round in domestic flocks.

Avian flu mutates readily within flocks of domestic birds. Thus a lo path strain may infect a flock for years with minimal effects only to mutate later into a hi path strain. The A/Avian/2003(H5/N1) differs antigenically from the A/Avian/Hong Kong/1997(H5/N1) outbreak. An investigation is ongoing but it appears that China was vaccinating poultry for the past year with an H5-containing vaccine. This strategy may have selected for a new mutant Avian H5N1 that is currently wiping out the Asian poultry industry.

Both hi and lo path avian influenza A viruses are adapted to their natural host species, birds. On rare occasions when enough of an inoculum is encountered, cross-species transmission occurs. For example, if humans are raising chickens in their backyard and the chickens succumb to a hi path virus, the human caretakers can become infected. The improper host (in this case, a person) develops disease, often severe or even lethal, but the infection is incapable of being transmitted from person-to-person. The concern is that the A/Avian (H5/N1) hi path virus may adapt to the human host through additional mutations (drift). This would set the stage for a new human influenza pandemic: a hi path virus capable of person-to-person transmission spread amongst an immunologically naïve world population never exposed to the H5 antigen.

What can be done to prevent the emergence of a new pandemic flu virus? On the human side, the World Health Organization works with designated influenza laboratories to develop new vaccines. This year two labs are working on a prototypic type A H5N1 human vaccine virus. Beginning with an H5N1 virus that killed a person in Vietnam, the labs–using a technique known as reverse genetics–are constructing a virus with the same antigenic profile but with less virulence. The prototype will be used as a seed virus to scale-up for vaccine production. An H5N1 vaccine may be ready for clinical use in ten months.

More importantly are the mitigation efforts of the agricultural industry. Aggressive culling (slaughter) of infected flocks remains the cornerstone of control. Even flocks infected with lo path variants should be culled as was done in Delaware recently. This strategy lowers the likelihood of a lo path to hi path mutation within a flock. Vaccination of birds is usually not indicated and its usefulness is controversial. Indeed, the selective pressure induced by a new avian H5 vaccine in China may have lead to the current H5N1 outbreak in Southeast Asia.

Biosecurity is the second most importation mitigation tool. In the United States, the poultry industry uses a variety of strategies to prevent the emergence of new infectious diseases. Of primary importance is the separation of animal species on the farm. Chickens are raised in large production facilities totally segregated from other animals. Control measures also limit the interaction of humans with domestic poultry through automation and the use of personal protective equipment and decontamination. Surveillance for circulating lo path avian flu is ongoing using serologic methods to detect asymptomatic infection.

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NC Severe Acute Respiratory Syndrome (SARS) Response Plan

Prepared by Kathy Dail, RN MEd, Nurse Epidemiologist
General Communicable Disease Control Branch &
Debbie Crane, Director, Public Affairs
North Carolina Department of Health and Human Services

The North Carolina State SARS Response Plan is now posted on the NC DHHS/DPH web page, making it available to public health officials, health care providers, and others. State Health Director Dr. Leah Devlin announced that the plan formalizes what North Carolina has already been doing – noting that the state's efforts last summer paid off when a SARS case was diagnosed in North Carolina and the disease controlled with no one else infected.

*(**SARS Response Plan,** continued from page 2)*

"In June, North Carolina recorded one of only eight confirmed SARS cases in the United States," she explained. "While only one person was actually infected with the SARS virus, many health care workers, family members, or other contacts of this person were exposed. Also, there was a great deal of effort to keep the public informed. Public health at the state and local level, health care providers and others worked on this case. Of course, there was also an enormous amount of work done in investigating potential SARS cases as well.

"All of the lessons learned from this experience in North Carolina as well as on the national and international scene have been captured in the SARS plan. The plan outlines clearly a solid framework for all of the players—the health departments, hospitals, other providers–in detecting any SARS case early and providing an aggressive and effective response," she explained. "We are closely following the international scene as SARS has reemerged in China. We know that SARS is again a possibility in North Carolina and we want to make sure that the work of public health and our partners is well coordinated in an investigation so that the effect on the public is minimized."

State epidemiologist Dr. Jeffrey Engel says that the plan is particularly important because it gives health care providers clear guidance on what to look for and how to deal with potential SARS cases. "Our first line of defense is the patient-provider encounter and early suspicion of the diagnosis of SARS," he said. "Rapid recognition, isolation of the patient, and reporting to public health is the key to containing this disease."

North Carolina health care providers enjoy a special link (http://www.dhhs.state.nc.us/dph/sars/state_sars_plan.htm.) that directs them to CDC guidance and NC State Laboratory of Public Health forms and consents.

The state plan mirrors the CDC national plan making it easy to accommodate changes to the document. Perhaps the greatest strength of the plan is that community providers with actual SARS experience were major contributors, including Wake and Orange County Health Departments and UNC Hospitals. The plan covers surveillance for the disease, preparedness in health care facilities, containing the disease, managing international travel risk, laboratory diagnosis, infection control, and communication.

The plan will evolve as more is learned about SARS. Another update is expected to the plan by late February and will address emergency transportation needs of SARS patients in the community setting.

The plan is posted on the web at http://www.dhhs.state.nc.us/dph/sars/state_sars_plan.htm.

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An Update on the HIV Outbreak Among Adults

Prepared by Judy Owen-O'Dowd, Special Projects and Policy Coordinator, HIV/STD Prevention and Care Branch

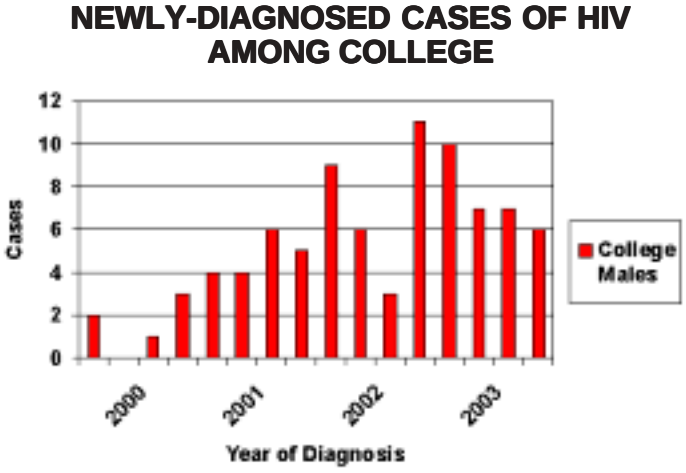
Epi Notes, Volume 2003-3 reported on the "HIV Outbreak Among Young Adults". At that time 56 cases of newly diagnosed HIV infection had been reported among males who were attending 30 colleges in the North Carolina. We also reported that the Centers for Disease Control and Prevention (CDC) had sent an Epi-Aid team of five HIV prevention experts to North Carolina to work in tandem with state staff to identify causative factors of the outbreak and what could be done to enhance the effectiveness of the prevention efforts.

In February 2004, the initial findings from the joint studies were shared at the Congress on Retroviruses and Opportunistic Infections in San Francisco by both the Centers for Disease Control and Prevention (CDC) and the North Carolina HIV/STD Prevention and Care Branch who worked with researchers at the University of North Carolina (UNC) at Chapel Hill. Dr. Lisa Hightow from UNC presented an update on the HIV outbreak among college students in North Carolina and Dr. Lisa Fitzpatrick from CDC presented behavioral data that contributed to the dramatic increase in college HIV infections.

Continued investigations have identified 84 North Carolina male college students who were diagnosed with new HIV infection between January 2000 and December 2003. The HIV cases dramatically increased starting in 2001 and cases have continued the increase in 2002 and 2003. (Figure 1) The investigations identified:

1. Eighty-seven percent of the cases were black males. **THIS IS AN OUTBREAK THAT AFFECTS ALL COLLEGES AND UNIVERSITIES, NOT JUST**

Figure 1



*(**HIV Outbreak,** continued from page 3)*

HISTORICALLY BLACK COLLEGES AND UNIVERSITIES (HBCUs).

2. Thirty-seven North Carolina colleges and universities have been named in connection with this outbreak. An additional seven schools in five other Southeastern states have been linked to the outbreak, thus indicating the outbreak is regional in scope.

3. While approximately 60% of the cases were identified as men who have sex with men (MSM), approximately 40% were identified as men who have sex with men and women (MSM/W) or men who have sex with women (MSW). This suggests that a substantial number of heterosexual college women are at a significant and, heretofore unrecognized, risk for HIV infection.

4. A case control study of HIV-positive and HIV-negative young black MSM found:

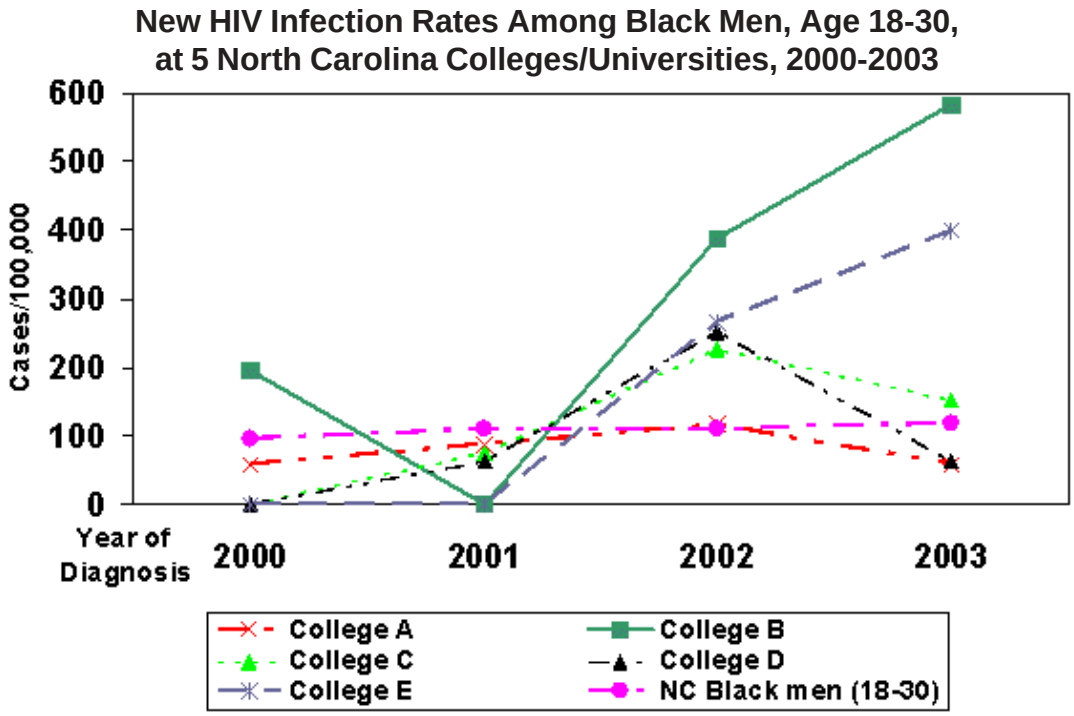
    a. High-risk behaviors are occurring in both HIV-positive and HIV-negative young MSM;
    b. College students were less likely to identify themselves as gay and/or disclose sexual orientation; and
    c. Venues for meeting sex partners are not limited to college campuses.

The investigators concluded that North Carolina is indeed experiencing a dramatic increase in HIV infections among young black men in North Carolina. The epicenter of this epidemic is our college population. Several schools have rates of new infections that truly represent a public health emergency and demand an immediate response (Figure 2). An underlying driving factor in the HIV epidemic of young black men is the continuing stigma associated with HIV and homosexuality that is so pervasive within our communities. We must move HIV prevention efforts into routine health care and create a safe environment for all populations at risk for HIV infection. Our investigation indicates that this epidemic of new HIV cases is not limited to North Carolina but extends to the entire Southeastern United States. The branch will be discussing prevention intervention efforts in this HIV outbreak during the Project Commit to Prevent's Student Leadership Conference, "Stomp Out HIV/STDs," planned for March.

The window of opportunity to intervene and reverse this trend is rapidly closing. We must act now. North Carolina has requested funds from CDC to intervene in this outbreak. To date we have not received any additional state or federal funding to address this growing epidemic in the young adults who should be the leaders of tomorrow.

For additional information please contact Judy Owen-O'Dowd at 919-733-9553 or through email at judy.owen.odowd@ncmail.net.

(Figure 2)



Is Lead Poisoning Your Child?

Prepared by Jeff Dellinger, Industrial Hygiene Consultant
Health Hazards Control Unit
Occupational & Environmental Epidemiology

North Carolina has more than half a million children under the age of six. Children in this age group are at the greatest risk of being poisoned by lead. To date, fewer than half of these children have had their blood lead levels tested. The Centers for Disease Control and Prevention (CDC) recommends that all children, under the age of six, be assessed for lead and emphasizes testing children at ages one and two. Between 1995 and 2002, there were 27,531 North Carolina children between the ages of six months and six years who were identified as having a blood lead level equal to or exceeding 10 micrograms per deciliter (ug/dL), the current threshold level set by CDC.

When children ingest lead it can cause a loss of intelligence, behavioral problems, and, in extreme cases, death. Exposure to even small amounts of lead can cause adverse health effects. Children who are poisoned by lead may have no apparent symptoms and can go undiagnosed and untreated for years. Children come into contact with lead-contaminated dust through normal hand-to-mouth activity. Children who ingest lead absorb and retain more lead in their bodies than adults, which interferes with the neurological development that is rapidly taking place in a child under the age of six. This environmental health problem can affect families from all races and socioeconomic classes.

Lead, a bluish-gray, naturally occurring mineral, has been used in hundreds of products. In the past lead was commonly used in paint, especially in housing built before 1978. In North Carolina, there are more than one and a half million homes built before 1978 that may contain lead paint. Paint that remains intact poses no immediate risk, but deteriorated paint can release lead-contaminated dust that is more readily accessible to children. Lead may also be found on floors, window wells and sills, and in the soil along the drip line of a home. Ingesting lead containing dust is the most common route of exposure to young children and lead dust is usually not visible, so you may not be aware that your child is being exposed. Before beginning any activity that may disturb paint in housing built before 1978, you should have the paint tested to determine if lead is present. **To find out if your home contains lead, contact the North Carolina Health Hazards Control Unit at 919-733-0820 for a listing of North Carolina Lead Certified Inspectors or Risk Assessors.**

Besides lead in paint, dust, and soil, other common sources of accessible lead include plastic mini-blinds, plastic cords, toys, china, crystal, fishing and hunting supplies, batteries, and stained glass. Children can be exposed to lead by consuming foods stored in low-fired, homemade pottery or ceramic ware with lead containing glazes or by taking traditional medicines such as Azarcon, Greta, Paylooah, and Litargirio. Children adopted from other countries have a greater risk of having an elevated blood lead because of the availability of lead containing gasoline and industrial emissions in some parts of the world.

Keep your home "lead safe" by keeping the paint intact and routinely wet mopping the floors, window wells, and other horizontal surfaces to remove lead dust. Make it a common practice to wash your child's hands before snacks and meals. Ensure that your child's diet contains the recommended levels of calcium and iron. If you haven't had your child tested by your physician or the local health department, please do so. Only a few drops of blood from a finger stick are needed to test a child for lead. All children enrolled in Medicaid are required to have a blood lead test at 12 months and again at 24 months of age. **If you need information about having your child tested for lead, contact the North Carolina Children's Environmental Health Branch at 1-888-774-0071.**

Additional information about lead can be obtained from the following web sites:

Centers for Disease Control and Prevention (CDC): www.cdc.gov
Environmental Protection Agency (EPA): www.epa.gov/lead
Housing and Urban Development (HUD): www.hud.gov/offices/lead

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Dr. Leah Devlin, State Health Director, NC Division of Public Health; Dr. Julie Gerberding, Director, Centers for Disease Control and Prevention; and Dr. William Roper, Dean, UNC School of Public Health at the 2004 State Health Director's Conference

Lead-Based Paint Remodeling and Renovation Activities

Prepared by Jeff Dellinger, Industrial Hygiene Consultant
Health Hazards Control Unit
Occupational & Environmental Epidemiology

This article summarizes several key activities that disturb lead-based paint and create lead hazards, which can poison children following remodeling and renovation activities. Studies show that routine remodeling and renovation activities that disturb lead-based paint can significantly increase lead dust hazards. For example, "dry" scraping of paint, demolition of painted components, sawing, and replacing painted windows can create lead dust hazards. Using uncontrolled power/belt sanders or flame burning lead-based paint significantly increases lead dust hazards and poses an even greater risk of contaminating the work area. Some of these activities can also lead to poisoning the worker even if he/she were wearing a half-face respirator approved to protect workers against lead.

The following contains some key information that you need to know about lead-based paint: **(1)** Children under the age of six are at the greatest risk when exposed to lead. **(2)** The current regulations address pre-1978 target housing and child occupied facilities. **(3)** Without a lead-based paint inspection or lead risk assessment to identify lead-based paint or pre-existing lead hazards you should assume all painted surfaces contain lead. **(4)** The US Department of Housing and Urban Development (HUD) and the US Environmental Protection Agency (EPA) considers paint having a concentration of lead at 0 .5% lead by weight or 1 mg/cm2 when using an XRF, an x-ray fluorescence instrument that uses a cobalt or cadmium source, to be lead-based paint. **(5)** However, even if the lead inspection or lead risk assessment identifies lead to be below what HUD and EPA considers lead in paint, there is still the potential to create a lead hazard. **(6)** Everyone involved in remodeling and renovation needs to be properly trained on how to safely handle lead-based paint or the lead dust created during the remodeling or renovation activity. **(7)** If you will be disturbing more then two square feet of lead-based paint during the renovation or remodeling activity and you are being compensated for your work, then you are required to provide the owner a copy of the EPA "Protect Your Family From Lead in Your Home" booklet. You will need to obtain proof of providing the booklet by asking for a signature and keeping the records for three years. Keep in mind that there are a few exceptions to this requirement such as emergency repairs, zero-bedroom dwellings, and do-it-yourself projects.

By nature, lead is sticky and has been proven to collect on walls and in some cases on ceilings during remodeling/renovation activities. Workers not taking the proper precautions can carry lead dust home on their shoes, clothes, and hands, thereby spreading lead dust from one location to another. Workers and their tools can also transfer lead dust to their vehicles and even to their own children. Remember it's not the paint chips we see but the lead dust we do not see which presents the greatest hazard to children. So what do you do?

In order to protect the children and others who may come in contact with the lead dust, apply the following work practices as a regular part of doing business. This list is not comprehensive.

(a) Contain your work area with plastic sheeting and keep everyone, especially kids and pets, out of the work area until the job is completed.
(b) Modify or shut-off the HVAC to your work area. This also applies when using portable/ceiling fans.
(c) Do not reuse plastic sheeting or cloth covers that have collected lead-based paint chips or lead dust.
(d) Create as little dust as possible by using wet methods. Use extreme caution around electrical sources.
(e) Use disposable booties and clothing to prevent carrying lead dust from one location to another.
(f) Properly clean up all of the visible debris and use a "true" high efficiency particulate air filtration (HEPA) vacuum cleaner to remove the lead dust you cannot see. HEPA vacuum cleaners can cost between $300 and $500 dollars, but will last for many years if properly taken care of. Do not accept a cheaper substitute that uses similar terminology but is not designed to collect lead dust. Do not use the homeowner's vacuum cleaner.
(g) Use a brand name liquid cleaner to clean all work area surfaces.
(h) Set up a hand washing station in your work area, and wash your hands thoroughly with soap and water before breaks, lunch, and end of the workday.
(i) Dispose of the lead contaminated water into the sewer system if allowed by the local water authority.
(j) Properly dispose of all lead painted building materials soon after the job is done.

To find out more about the pre-renovation regulation or lead-safe work practices call the national "Lead Hotline" at 1-800-424-LEAD for additional resources.

For additional information on lead-based paint or a listing of North Carolina Certified Lead-Based Paint Inspectors and Risk Assessors, contact the North Carolina Health Hazards Control Unit (HHCU) at (919) 733-0820.

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Iredell County *Staphylococcal auerus* Outbreak

Prepared by Pamela R. Jenkins, MSN, Ed.D
Foodborne Disease Nurse Epidemiologist and
Jeffrey Engel, MD, State Epidemiologist
Head, General Communicable Disease Control Branch

On November 3, 2003 the Iredell County Health Department (ICHD) was notified that seven patients had been seen with nausea, vomiting and diarrhea in local hospitals. Three of them had been admitted. All reported having eaten ham at a local cafeteria on Sunday, November 2. Ill patrons reported symptoms within hours of eating at the restaurant. ICHD notified the North Carolina Department of Health and Human Services and the Department of Environment and Natural Resources regional office.

The health department began active surveillance by notifying the local hospitals, urgent cares, and large private practice offices of a possible foodborne illness outbreak. The state and local health department officials initiated the traditional three-pronged approach – a case-control study to identify risk factors for the infection, environmental investigation, and laboratory studies.

Case-Control Study
In the case-control study, a questionnaire was developed to determine clinical history and exposure to cafeteria food served on Sunday, November 2. Cases were defined as anyone who ate at the cafeteria on Saturday, November 1 or Sunday, November 2 who experienced vomiting and/or diarrhea (i.e., three or more loose stools in an eight-hour period) within 24 hours of dining at the cafeteria. This was refined during data analysis to include only those who ate at the cafeteria on Sunday. Controls were well eating companions or any well person who ate at the cafeteria on Sunday.

Demographic information was collected on a total of 166 persons, 78 identified themselves as sick and 88 as well. From these, a food history was collected on 71 cases and 81 controls. Data analysis was done on the 60 cases and 74 controls who ate at the cafeteria on Sunday, November 2. Univariate, stratified and logistic regression modeling were done using EpiInfo2002.

Environmental Investigation
ICHD Environmental Health (EH) staff members visited the cafeteria within hours of the first call. A full inspection of the establishment was conducted, and all remaining food products from Sunday, November 2 were set aside in the cafeteria cooler for sampling. Sixteen samples were taken and eleven were tested. The following food items, taken from the cafeteria or take-outs brought in by patrons, were sent to State Laboratory of Public Health (SLPH): ham, spaghetti, steak, country style steak, green beans, lima beans, baked apples, coconut cream pie, pumpkin pie, macaroni and cheese, turnip greens and Jell-O. Proper food sample packaging, shipping and chain of custody procedures were followed.

All 67 cafeteria staff who were on duty during the October 31 through November 3 time period, including managers, were interviewed by ICHD EH. An ICHD Spanish interpreter assisted the EH Specialists during interviews of Spanish speaking/low English proficiency employees. Employee interviews revealed no employee with any illnesses, skin lesions or upper respiratory symptoms. Due to the focus on baked ham, the fourteen individuals who handled the baked ham were interviewed more extensively and detailed notes were collected on ham handling procedures.

Laboratory Investigation
Human and environmental specimens were processed at the State Laboratory of Public Health. Stools were cultured for multiple bacterial pathogens, including E. coli O157:H7, Campylobacter, Salmonella, Shigella, Yersinia, and Staphylococcus aureus. Stool specimens from a total of thirteen persons who met the original case definition and were still symptomatic (i.e. still had diarrhea) were tested. When S. aureus was identified in the ham and human specimens, pulsed field gel electrophoresis (PFGE) was performed to further characterize outbreak-related isolates.

Results

Epidemiology
The epidemiologic curve showed a point source outbreak, and the total population at risk (i.e. those who ate at the cafeteria on November 2, 2003) was 2,230, with baked ham being served to 170 patrons. Mean age of cases was 53 years of age and controls 42 years of age. Major symptoms experienced were: diarrhea (90%, n=54); nausea (88%, n=53); vomiting (78%, n=47); and abdominal cramps (68%, n=41).

Based on univariate analysis of the data, consumption of ham (Odds Ratio [OR] 19.09, 95% CI 7.96,45.81) and pumpkin pie (OR 5.54, 95% CI 1.13,27.16) were each associated with illness. Stratified and logistic analyses were performed. The following results were obtained (See Figure 1 on page eight): The results show that only baked glazed ham remained significantly associated with illness.

(continued on page 8)

*(**Staphylococcal aureus Outbreak,** continued from page 7)*

Figure 1

Stratified Analysis					
	Crude OR	OR for +	95% CI	OR for -	95% CI
Adjusted for Pumpkin Pie					
Ill and Baked Ham	19.09	Undef	Undef	19.79	7.84, 49.95
Adjusted for Baked Ham					
Ill and Pumpkin Pie	5.54	Undef	Undef	6.44	0.80, 51.69

Logistic Regression						
Parameter	OR	95%	Coefficient	S.E.	Z-Statistic	P-Value
Baked Ham	14.0403	5.9297,33.2550	2.6419	0.4399	6.0053	<0.00001
Pumpkin Pie	2.2318	0.4482,11.1127	0.8028	0.8190	0.9802	0.3270
CONSTANT	*	*	-1.8666	0.3500	-5.3335	<0.00001

Environmental and Laboratory Study Results

The sanitation inspection conducted within hours of the first report of the outbreak revealed inadequate hot holding temperatures in the unit used to cook and hold baked ham at the proper temperature (Alto-Sham). Subsequent cafeteria maintenance reports and 24-Hour temperature monitoring indicated the Alto-Sham was not maintaining foods at the displayed temperature. In addition, one cook (a ham handler) reported that cooked ham remained at room temperature on an unheated shelf above the oven for several hours before glazing, carving and serving on November 2.

The following are the positive results of the food sample cultures sent to the SLPH:

Figure 2

Foods Sampled	Results (colonies/gm)
Ham Sample 1	2.8×10^8 *S. aureus* 7×10^7 *S. epidermis*
Ham Sample 2	≥800,000 *S. aureus*/gm
Ham Sample 3	1×10^6 *S. aureus*

Negative results were obtained for the spaghetti, country style steak, steak, green beans and lima beans.

The State Laboratory of Public Health tested stool specimens from the12 patients who ate at the cafeteria on November 2, six were positive for S. aureus and six were negative. Five of the six stool S. aureus cultures and the 6 positive ham S. aureus cultures were then submitted for PFGE. All 11 PFGE patterns were identical.

Conclusion

An outbreak of S. aureus food poisoning was found to be associated with eating ham at a cafeteria-style restaurant. Environmental investigation revealed a malfunctioning oven and warming unit and improper handling of the ham as the cause. This event emphasized the importance of proper temperature control and food handling in preventing serious foodborne outbreaks. Regardless of whether the ham had been contaminated when it came in, or became contaminated during handling, proper cooking and holding temperatures would have prevented bacterial overgrowth, the cause of this outbreak.

S. aureus can cause an acute gastroenteritis by excreting a potent exotoxin. Symptoms of nausea and vomiting usually occur within six hours of eating a contaminated food item because a preformed toxin causes illness, bacterial replication inside the body is not required. Five exotoxins, designated A-E, are known to exist and are detectable by standard laboratory methods. The S. aureus isolates from this outbreak were sent to the CDC for exotoxin detection and characterization.

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Reported Communicable Disease Cases, NC, January-December 2003 (by date of report)*

Disease	Year-to-Date (Fourth Quarter)			4th Quarter 2003	Comments / Note
	2003	2002	Mean (98-2002)		
Brucellosis	**1**	2	2	1	
Campylobacter	**825**	683	546	225	
Chlamydia, laboratory reports	**26066**	24738	22621	6819	
Creutzfeldt-Jakob disease	**3**	1	-	2	Note 9
Cryptosporidiosis	**56**	40	-	22	Note 1 & 2
Cyclosporiasis	**2**	0	-	0	Note 1 & 2
Dengue	**3**	3	2	1	
E. coli, Shiga toxin-producing	**37**	59	131	12	Note 3 & 9
Ehrlichiosis, Granolocytic	**2**	1	-	2	Note 1 & 2
Ehrlichiosis, Monocytic	**28**	13	-	12	Note 1 & 2
Encephalitis, California group	**25**	13	-	13	Note 1 & 4
Encephalitis, Eastern Equine	**1**	0	-	0	Note 1 & 4
Encephalitis, West Nile Virus	**16**	0	-	13	Note 1 & 4
Foodborne, C. perfringens	**2**	1	10	0	
Foodborne, other	**34**	281	65	1	
Foodborne, staphylococcal	**85**	75	29	81	
Gonorrhea	**15085**	15353	17746	3779	
Haemophilus influenzae	**41**	33	33	6	
Hepatitis A	**124**	209	180	52	
Hepatitis B, acute	**163**	233	235	53	
Hepatitis B, chronic	**1023**	896	705	224	
Hepatitis B, Perinatal	**4**	1	-	3	Note 10
Hepatitis C, acute	**13**	29	26	2	Note 1 & 4
Hemolytic Uremic Syndr. / TTP	**3**	2	3	1	
HIV/AIDS	**2100**	1705	1553	443	Note 5
Legionellosis	**42**	13	14	12	
Leptospirosis	**1**	0	1	0	
Listeriosis	**18**	8	-	3	Note 8
Lyme disease	**155**	137	72	78	
Malaria	**25**	22	29	6	
Measles	**1**	0	0	0	
Meningococcal disease	**37**	35	49	7	
Meningitis, pneumococcal	**25**	38	47	3	
Mumps	**2**	2	7	0	
Q Fever	**2**	2	1	1	
Rabies, animal	**759**	702	568	159	
Rocky Mountain Spotted Fever	**324**	294	156	152	
Salmonellosis	**1416**	1655	1366	458	
Shigellosis	**1058**	1074	483	243	
Strepto. A, invasive	**106**	122	81	14	Note 2
Syphilis, total	**396**	616	1086	77	Note 6
Tuberculosis	**374**	434	453	143	
Toxic Shock Syndrome (TSS)	**2**	5	4	1	
TSS, Streptococcal	**4**	0	0	0	
Tularemia	**1**	1	2	0	
Typhoid, Acute	**9**	2	2	2	
Vaccinia	**4**	-	-	0	Note 9
Vanco. Resistant Enterococci	**563**	531	366	120	Note 2
Vibrio, other	**6**	11	10	2	Note 2
Vibrio vulnificus	**9**	4	4	4	
Whooping cough	**144**	46	93	45	

* Preliminary data, as of 2/4/2004. Quarters are defined as 13 weeks periods. Only diseases with cases reported in the year 2003 are listed in the table. Notes: 1. - =Not reportable in this entire time period; 2. Reportable since 8/1/1998; 3. E. coli O157:H7 became reportable 10/1/1994; 4. Became reportable as "Hepatitis C, acute" rather than the previous "Hepatitis, non A-non B," and as "arboviral encephalitis" (coded by type) rather than "Encephalitis," both changes 8/1/1998; 5. Earliest report with HIV infection or AIDS diagnosis; 6. Primary, secondary and early latent syphilis; 7. Reportable since 7/1/1997; 8. Reportable since 7/2001; 9. Reportable since 2/15/2003; and E. coli, Shiga toxin-producing replaces E. coli O157:H7; 10. Coded as such since 2002.

SUMMARY OF EPIDEMIOLOGY RULES CHANGES, JAN 1, 2003 – DEC. 31, 2003

Effective June 1, 2003, all Division of Public Health rules in the North Carolina Administrative Code were recodified. To locate those Epidemiology Section rules in the North Carolina Administrative Code, one must now look under Title 10A ("Epidemiology Health") and then under Subchapter 41A ("Epidemiology Health"). The numbers of the individual rules remain basically unchanged. [For example, the rule "Reportable Conditions," which formerly was 15A NCAC 19A.0101, now is 10A NCAC 41A.0101.]

Additionally, during the past two years we have changed several of our Epidemiology Division public health rules and have added several more. The most significant of these are as follows:

10A NCAC 41A.0101 [Reportable Diseases and Conditions] - monkeypox. SARS, and vaccinia added to the list of reportable conditions

10A NCAC 41A.0102 [Method of Reporting] - manner of reporting diseases clarified

10A NCAC 41A.0201 [Control Measures - General] - communicable disease control measures changed

10A NCAC 41A.0202 [Control Measures - HIV] - prenatal testing for HIV required unless mother refuses

10A NCAC 41A.0203 [Control Measures - Hepatitis B] - HBV control measures expanded

10A NCAC 41A.0204 [Control Measures - Sexually Transmitted Diseases] - chlamydia testing required for pregnant women

10A NCAC 41A.0208 [Control Measures - Smallpox; Vaccinia Disease] - vaccinia control measures stipulated

10A NCAC 41A.0209 [Laboratory Testing] - serogroup testing for Haemophilus influenza required

10A NCAC 41A.0212 [Handling and Transportation of Bodies - proper handling of bodies infected with SARS stipulated

10A NCAC 41A.0213 [Control Measures - SARS] - control measures for SARS stipulated

10A NCAC 41A.0401 [Dosage and Age Requirements for Immunization] - varicella vaccine stipulated; State Health Director authorized to suspend immunization rules; immunization requirements conformed to CDC recommendations

10A NCAC 41A.0901/.0907 [Biological Agent Registry; Biological Agents to be Reported; When to Report; What to Report; Exemption from Reporting; Security; and **Release of Information] -**Bioregistry established

Finally, a change to **10A NCAC 41A.0209** that requires laboratory testing of tuberculosis isolates is in progress and should become effective during March or April of this year.

The texts of these Epidemiology Division rules can be viewed on the Office of Administrative Hearings website www.oah.state.nc.us/. To review the text of a rule open the site and proceed as follows:

1. click on "Rules Division"
2. click on "NC Administrative Rules"
3. click on "Administrative Code Online"
4. click on "Title 10A – Health and Human Services"
5. click on "Chapter 41 – Epidemiology Health"
6. click on "Subchapter A Rules"

*(**Staphylococcal aureus Outbreak,** continued from page 8)*
S. aureus is a ubiquitous organism and an important human pathogen. Approximately 10-20% of the human population are carriers of S. aureus. It was likely that one of the food handlers contaminated the ham at the restaurant, however it was decided not to culture food handlers in this outbreak.

The main reason for this decision was the discovery of the improper temperature maintenance of the implicated food item that resulted in bacterial overgrowth. Culturing food handlers may have identified carriers that were not necessarily transmitters. Transmitters are more likely to have S. aureus skin disease (boils) and this was not the case in this outbreak. Also, S. aureus transmission is associated with viral upper respiratory infections (from nasal carriage) and this, too, was not the case. Finally, no further cases occurred after replacing the malfunctioning oven. A positive S. aureus culture from a food handler may have resulted in unfounded discrimination.

* * * * *

Dr. John (Newt) MacCormack Inaugural Ronald H. Levine Award Recipient

Prepared by Douglas Campbell, MD, MPH, Head
Occupational & Environmental Epidemiology Branch

Dr. John Newton (Newt) MacCormack was awarded the Inaugural Ronald H. Levine Legacy Award for Public Health on January 30, 2004 at the Annual State Health Director's Conference in Raleigh, North Carolina. This award was established to honor an individual whose life work on behalf of the public's health has resulted in significant, sustainable, and positive improvement in North Carolina's public health system. The award recognizes the work of former state health director, Dr. Ronald H. Levine, who embodied these criteria.

Dr. MacCormack retired from public health service in 2002 and is currently working as a part-time consultant in the Occupational and Environmental Epidemiology Branch of the Epidemiology Section. At the time of his retirement he was acting head of the General Communicable Disease Control Branch in the Epidemiology Section. He began his 34-year career as head of the Communicable Disease Control Branch. He served in this capacity from 1968 until 1983. He then served as the State Epidemiologist from 1984 until 1994 and from 1998 until 2002. In this position he was instrumental in organizing and directing epidemiologic efforts for both communicable and non-communicable diseases. During his career he was instrumental in designing and applying appropriate studies for the control of acute and long-term health problems. He educated and acted as a mentor for local and state health department staff, and educated health care professionals and the public about epidemiologic and medical issues. He published numerous articles on several medical issues including Rocky Mountain Spotted Fever and bioterrorism. He was mentor to several Epidemic Intelligence Service Officers from CDC. Because he was so widely known and well-respected, he was often the "first call" from local public health departments and medical practitioners for matters of public health and epidemiology. He is well known and highly respected throughout the public health sector. His hard work has influenced public health intervention and has helped keep the focus on efficient and sound standards of care in North Carolina. His efforts will benefit citizens of North Carolina for many years to come.

* * * * *

Employee Recognition: Employee of the Quarter Patsy West

Prepared by Nancy Garrett, Administrative Assistant, Occupational and Environmental Epidemiology Branch and Angela Green, Administrative Secretary Epidemiology Section

Patsy West has received the Epidemiology Section's Employee Recognition Award for the fourth quarter of 2003. Ms. West was nominated in the category of Service Excellence. The dedicated quality of work that is consistently demonstrated by Ms. West also encompasses the categories of Volunteerism, Teamwork, Leadership, and Safety and Wellness within the Epidemiology Section.

A career state employee who began state employment in June 1983, Ms. West is presently an administrative assistant in the Epidemiology Section. She has also worked in the Oral Health Section and the Department of Human Resources. Her unending consideration of all epidemiology staff is demonstrated by her relentless volunteering of her many years of knowledge and experience to assist branch heads and supervisors. She knows how to get things done while adhering to the state's various rules and regulations. Not only does she provide advice and support to the managers, but for all Epidemiology employees as well. Ms. West has many thankless responsibilities (building coordinator, parking coordinator and safety officer) which make the day-to-day working of the section a success. She has an exemplary work ethic. Because of her diligent attention to detail, fairness to all employees in all situations, and gentle yet persistent reminders to staff, Ms. West provides assistance to Dr. Cline and all the branch heads that has allowed the section to function effectively. She is a teamplayer and is always willing to go the extra mile. She is a valued employee and a true public health servant.

In addition to receiving the award, Ms. West will be presented with a gift certificate to a local restaurant from the Epidemiology Section Management Team.

State of North Carolina • Michael F. Easley, Governor
Department of Health and Human Services • Division of Public Health
Epidemiology Section • www.epi.state.nc.us/epi/

Dr. J. Steven Cline, Epidemiology Section Chief
Managing Editor, J. Steven Cline
Layout and Typesetting, Angela Green

Epidemiology Section Office (919) 733-3421
General Communicable Disease Control Branch (919) 733-3419
HIV/STD Prevention and Care Branch (919) 733-7301
Occupational and Environmental Epidemiology Branch (919) 733-3410
Rabies Emergency Number - Nights, Weekends, Holidays (919) 733-3419
EMERGENCY NUMBER - Nights, Weekends, Holidays (919) 733-3419

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State of North Carolina
Division of Public Health
Epidemiology and Communicable Disease Section
1902 Mail Service Center
Raleigh, NC 27699-1902